

CLAIMS

Inv A3
Having thus described my invention, what I
claim as new and desire to secure by Letters
Patent is as follows:

1. A method of measuring overlay alignment of sequential lithographic exposures, said method including steps of
 - 4 forming first separated features on a surface,
 - 6 forming second separated features on said surface interleaved between said first separated features, and
 - 9 illuminating said first and second separated features and detecting an interference pattern.
1. 2. A method as recited in claim 1, including the further step of calculating a spectrographic response corresponding to said interference pattern.
1. 3. A method as recited in claim 1, wherein said illuminating and detecting step is performed with a specular spectroscopic scatterometer.
1. 4. A method as recited in claim 3 wherein said scatterometer is of the reflectometer type.
1. 5. A method as recited in claim 3 wherein said scatterometer is of the ellipsometer type.
1. 6. A method as recited in claim 5, wherein said ellipsometer measures complex reflectivity spectral ratio for two orthogonal polarizations with broadband illumination.

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1 7. A method as recited in claim 1 wherein said
2 illumination is broadband light.

1 ~~18/26~~ 8. A metod as recited in claim 1 wherein said
2 detection measures ~~amplitude~~ and phase.

1 9. A method as recited in claim 1, wherein said
2 illumination and detection step results in
3 measured spectral curves and including the further
4 steps of

5 modelling said first and second features by
6 simulation to obtain simulated spectral curves,
7 and

8 comparing said measured spectral curves with
9 said simulated spectral curves.

1 10. A method as recited in claim 9, wherein said
2 comparing step includes use of an optimization
3 technique to determine best fit and to quantify a
4 misalignment value.

1 11. A test mark including
2 a plurality of marks formed by a lithographic
3 exposure,
4 a mark formed between said plurality of marks
5 by another lithographic exposure,
6 said mark and said plurality of marks forming
7 a periodic structure.

1 *SUB B.* 12. A non-imaging metrology apparatus comprising
2 means for storing spectral curves,
3 a specular spectroscopic scatterometer for
4 measuring reflection from a plurality of marks
5 formed by two lithographic exposures and forming a
6 periodic structure, and *B*
7 means for comparing processed signals output
8 from said specular spectroscopic scatterometer
9 with said spectral curves to evaluate misalignment
10 of said two lithographic exposures.